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Nomenclatural Innovations in Neotropical Salicaceae

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ABSTRACT. *Macrothumia* M. H. Alford is described as a new genus of Salicaceae based on *Neosprucea kuhlmannii* Sleumer from Brazil. The deciduous perianth, papillate leaf teeth, presence of receptacular disk glands, and analyses of plastid DNA data suggest that the new genus is more closely related to *Ahernia* Merrill and *Pleuranthodendron* L. O. Williams than to *Banara* Aublet or *Neosprucea* Sleumer. The monotypic genus *Aphaerema* Miers of Brazil and Argentina is transferred to *Abatia* Ruiz & Pavón, based on analyses of plastid DNA sequences and on the lack of morphological discontinuities between the genera. Because the name *Abatia spicata* (Turczaninow) Sleumer already exists, *Abatia angeliana* M. H. Alford is published as a replacement name for *Aphaerema spicata* Miers. A lectotype for *Aphaerema spicata* is also designated. The monotypic Hispaniolan genus *Priamosia* Urban, originally described as separate from *Xylosma* G. Forster based on its few stamens (four, instead of eight to numerous), is transferred to *Xylosma*, and a neotype is designated for *Xylosma domingensis* (Urban) M. H. Alford.

RESUMO. *Macrothumia* M. H. Alford é descrito como um novo gênero de Salicaceae, com base em *Neosprucea kuhlmannii* Sleumer do Brasil. O perianto decíduo, as papilas nos dentes das folhas, a presença de discos glândulares receptaculares e a análise de dados de DNA do plastídeo sugerem que o novo gênero é mais proximamente relacionado a *Ahernia* Merrill e *Pleuranthodendron* L. O. Williams do que a *Banara* Aublet ou *Neosprucea* Sleumer. O gênero monotípico *Aphaerema* Miers do Brasil e da Argentina

é transferido para *Abatia* Ruiz & Pavón, com base em análises de seqüências de DNA do plastídeo e devido à ausência de descontinuidades morfológicas entre os gêneros. Em razão do nome *Abatia spicata* (Turczaninow) Sleumer já existir, *Abatia angeliana* M. H. Alford é publicado para substituir *Aphaerema spicata* Miers. Um lectótipo para *Aphaerema spicata* também é designado. O gênero monotípico *Priamosia* Urban, da ilha de Hispaniola, originalmente descrito fora de *Xylosma* G. Forster com base em seus poucos estames (quatro, em vez de oito a numerosos), é transferido para *Xylosma*, e um neótipo é designado para *Xylosma domingensis* (Urban) M. H. Alford.

Key words: *Abatia*, *Aphaerema*, Argentina, *Banara*, Brazil, Flacourtiaceae, Hispaniola, *Macrothumia*, *Neosprucea*, *Priamosia*, Salicaceae, *Xylosma*.

Based on recent phylogenetic analyses of Salicaceae using both morphological and molecular data (Alford, 2005; Chase et al., 2002), several taxonomic changes were deemed urgent and sufficiently well supported to precede a forthcoming treatment of the family in the Kubitzki-edited series *The Families and Genera of Flowering Plants* (S. Zmarzty, in prep.). Salicaceae now include a large part of the former Flacourtiaceae (Alford, 2005; Chase et al., 2002), and the taxa considered here were all formerly placed in Flacourtiaceae. Phylogenetic analyses indicate that the monotypic *Aphaerema* Miers is nested within *Abatia* Ruiz & Pavón, that the monotypic *Priamosia* Urban is nested within *Xylosma* G. Forster, and that the species usually treated as *Banara kuhlmannii*

(Sleumer) Sleumer [= *Neosprucea kuhlmannii* Sleumer] belongs in a separate genus allied more closely to *Pleuranthodendron* L. O. Williams and *Ahernia* Merrill.

MACROTHUMIA, NEOSPRUCEA, AND BANARA

In 1950 Sleumer described a new species from Brazil as part of his recently established genus *Neosprucea* Sleumer. Sleumer (1936, 1938) had segregated *Neosprucea* from *Banara* Aublet based on the former having spiciform racemes with 4- or 5-merous flowers and linear-elongate anthers. In contrast, the remaining species of *Banara* usually have paniculate inflorescences (rarely racemose, fascicular, or with flowers solitary) with 3-merous flowers and globose to ellipsoidal anthers. Both genera have highly intruded parietal placentation and include several species with leaves that are 3-veined from the base. Sleumer's (1950) new species, *N. kuhlmannii*, had strongly 3-veined leaves and highly intruded parietal placentation, but he saw no material with flowers. Regardless, he was convinced that the new species belonged in *Neosprucea* due to its large fruit (> 3 cm diam.). Such a large fruit had never been observed in *Banara*, and the few available fruits of *Neosprucea* were larger than those of most *Banara*. Following the collection of additional specimens, Kuhlmann (1953) reinforced Sleumer's claims, pointing out that *N. kuhlmannii* was 4-merous and had flowers disposed in a racemose inflorescence. Kuhlmann did not mention anther shape. These characteristics matched those of the described species of *Neosprucea* and were unlike those of *Banara*.

In 1978, however, Sleumer transferred the species to *Banara* without comment, presumably because he had then seen flowers and realized that the globose to ellipsoidal shape of the anthers was characteristic of *Banara*, not *Neosprucea*. Sleumer (1980) maintained this treatment of the species as *Banara kuhlmannii* (Sleumer) Sleumer in his monograph of the Neotropical Flacourtiaceae.

The first specimen of *Banara kuhlmannii* that I examined (A. M. de Carvalho et al. 6689, MO) was annotated by Ron Liesner in 2000 as "If Flacourtiaceae, new genus! To me it looks like a Flacourt! Need fls [flowers]." Although the species had already been described, his intuition was correct. The species has several characters atypical of either *Banara* or *Neosprucea*. The glandular apices of the leaf teeth are papillate (violoid) instead of spherulate (salicoid) or torus-shaped (see Leaf Architecture Working Group, 1999; Hickey & Wolfe, 1975; Alford, 2005), and it has receptacular disk glands and a perianth that is deciduous after anthesis. This combination of

characteristics is indicative of *Ahernia* and *Pleuranthodendron*. Because this species differs in several key characters from those other genera (see description and key below), a new genus is erected here. Another possibility is to lump all three entities into *Ahernia*, the name with priority, but because their interrelationships are still unresolved (Alford, 2005) and because *Pleuranthodendron* is a relatively common genus of the Neotropics, the more conservative and less disruptive approach is the creation of a new genus.

Macrothumia M. H. Alford, gen. nov. TYPE: *Macrothumia kuhlmannii* (Sleumer) M. H. Alford, Figure 1.

Genus novum, *Aherniae* Merrill affine, a qua fructibus majoribus et numero petalorum differt, et *Pleuranthodendro* L. O. Williams affine, a quo inflorescentia haud ramosa et numero seminum et tepalorum differt. Arbor, folia simplicia, alterna, ovata vel oblongo-elliptica, ad apicem petioli glandulis duabus rotundis crassis operculatis instructa, margine inconspicue serrato, venatione foliorum actinodroma. Inflorescentia terminalis racemosa fasciculatiformis vel umbelliformis, sepala et petala 3 vel 4, post anthesin decidua, stamina numerosa, antherae ellipsoideae, glandulae disci praesentes, ovarium superum. Capsula globosa, 3–5 cm diametro, multiseminata, pseudo-8–9-locularis, placentibus 8–9-lamelliformibus, in cavitatem profunde prominentibus, pericarpio fragili subcoriaceo.

Trees to 20 m tall, 30 cm DBH. Leaves simple, alternate, ovate to oblong-elliptic, 6–13 × 3–8 cm, apex acute to shortly acuminate, base rounded to subcordate, chartaceous, deciduous, margin subentire to inconspicuously serrate with papillate apices of the teeth, venation actinodromous, petiole 2–4.5 cm long, apex of petiole bearing a pair of thick, projecting, cup-shaped glands. Inflorescence a terminal, congested, fascicle- or umbel-like raceme of 3 to 9 flowers; sepals and petals 3 or 4, creamy yellow, ca. 1 cm long, deciduous in fruit; stamens numerous (ca. 100 to 130), anthers ellipsoidal, longitudinally dehiscent; disk glands present, consisting of a single whorl of 6 to 8(to 9) pad-like or crateriform disks, ca. 1 mm diam., with stamens arising inside, outside, and between the glands; ovary superior; style 1; stigma consisting of several minute craters at the apex of the abruptly expanded style. Infructescence of few fruits, often consisting of only 1. Capsule globose, 3–5 cm diam., multiseeded, with 8 or 9 highly intruded parietal placentae, fruit wall subcoriaceous but brittle, base of style persistent. Seeds exarillate.

Macrothumia is a new genus allied to *Ahernia* and *Pleuranthodendron*. *Macrothumia* has parietal placentation, congested, fascicle- or umbel-like racemes, three or four petals per flower, and large fruits

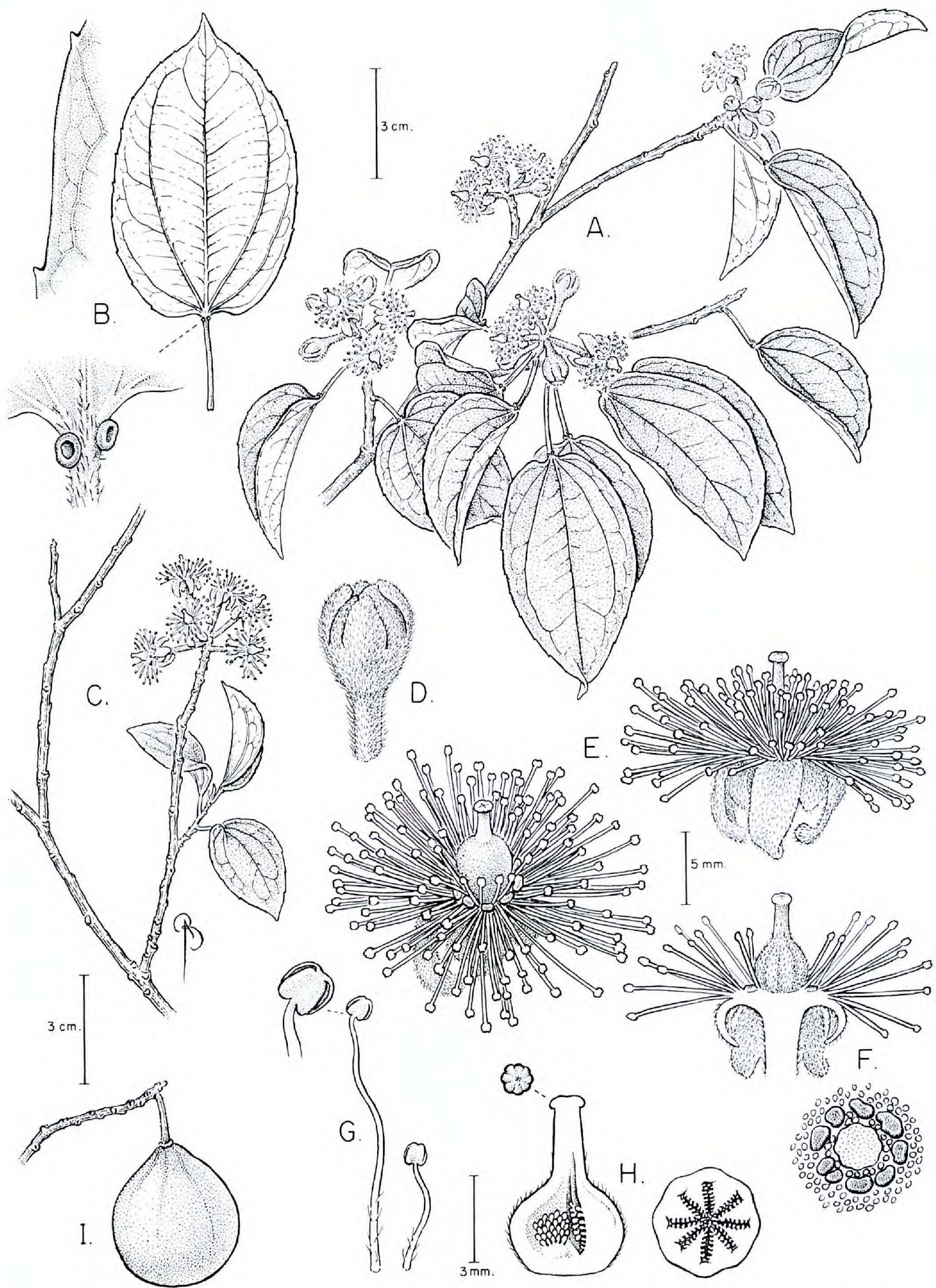


Figure 1. *Macrothumia kuhlmannii*. —A, C. Flowering branches. —B. Leaf, with close-ups of teeth and glands at the apex of the petiole. —D. Floral bud. —E. Flowers at anthesis. —F. Longitudinal section and cross section of a flower showing receptacular disk glands. —G. Stamens. —H. Pistil, close-up of stigma, and cross section of ovary, showing highly intruded parietal placentation. —I. Mature fruit. Scale bar equals 3 cm for A–C and I, 5 mm for E and F, and 3 mm for G and H. Length of D equals 1.3 cm. A, B, D, F, G, and H drawn from *Mori et al. 10641* (NY, herbarium sheet, spirit collection, and photos), C and E from *Thomas et al. 12530* (NY, herbarium sheet and photos), and I from *Pirani et al. 3384* (NY).

(> 3 cm diam.) with many seeds, whereas *Ahernia* has 10 to 15 petals per flower and smaller fruits (< 2.5 cm long), and *Pleuranthodendron* has large disorganized panicles and one seed per fruit.

Etymology. *Macrothumia* (μακροθυμία [f.]) is a Greek word for long-suffering or enduring patience, a virtue prized by taxonomists.

Macrothumia kuhlmannii (Sleumer) M. H. Alford, comb. nov. Basionym: *Neosprucea kuhlmannii* Sleumer, Lilloa 23: 248. 1950. *Banara kuhlmannii* (Sleumer) Sleumer, Blumea 24: 118. 1978. TYPE: Brazil, Espírito Santo: Colatino, Rio Doce, 30 Nov. 1943, J. G. Kuhlmann 6559 (holotype, RB not seen; isotypes, LIL not seen, RB photo at USMS).

Distribution. Brazil (Bahia, Espírito Santo, Minas Gerais).

Representative specimens examined. BRAZIL. **Bahia:** Belém & Pinheiro 2878 (NY), Carvalho et al. 6689 (MO), Mori et al. 10640, 10641 (NY), Mori & Thompson 11016 (NY), Thomas et al. 7063 (NY), Thomas et al. 12530 (MO, NY). **Espírito Santo:** Kuhlmann 6449 (FSU), Pirani et al. 3384 (NY). **Minas Gerais:** Mexia 5294 (BM, NY).

A thorough description of the species may be found in Sleumer (1980), as *Banara kuhlmannii*, although he failed to mention the key character of receptacular disk glands and reported, with the material at his disposal, that the flowers were 3-merous (or rarely 4-merous by splitting of the petals) instead of 3- or 4-merous. Information about the use of *Macrothumia kuhlmannii* as refreshment for both humans and wildlife may be found in Kuhlmann (1953).

KEY TO THE GENERA OF SALICACEAE WITH LEAVES 3-VEINED FROM THE BASE, PAPILLATE (VIOLOID) LEAF TEETH (NOT SPHEROIDAL OR TORUS-SHAPED), AND PAIRED GLANDS AT THE BASE OF THE LAMINA OR APEX OF THE PETIOLE

- 1a. Placentation axile, or parietal with later development of a pseudo-axis ("pseudoaxile"); perianth persistent in fruit; a pair of elliptic leaf glands embedded in the base of the lamina (see photo in Alford, 2003) *Hasseltia*
- 1b. Placentation parietal; perianth deciduous in fruit; a pair of circular leaf glands projecting from the lamina-petiole junction or apex of the petiole (see photo in Alford, 2003).
 - 2a. Inflorescence a panicle; seed(s) 1(or 2) per fruit *Pleuranthodendron*
 - 2b. Inflorescence a raceme, this sometimes congested and fascicle- or umbel-like; seeds per fruit numerous.
 - 3a. Raceme terminal, congested and fascicle- or umbel-like; fruit large, spherical (> 3 cm diam.); petals 3 or 4; Brazil *Macrothumia*
 - 3b. Raceme axillary, not congested; fruit small, obovoid to ellipsoid (< 2.5 cm long); petals 10 to 15; Philippines . . . *Ahernia*

ABATIA AND APHAEREMA

Abatia, *Aphaerema*, *Pseudoscopia* Gilg, and *Homalium* Jacquin are the only genera in Salicaceae that have opposite leaves. *Aphaerema* and *Abatia* are closely related Neotropical genera, *Pseudoscopia* is a South African genus of a different tribe, and *Homalium* is a pantropical genus of a different tribe with only a few species from Madagascar that have opposite or whorled leaves. *Aphaerema* is a monotypic genus from Brazil and Argentina of small shrubs (< 0.5 m) with 8(to 12) stamens and no staminodes (Angely, 1962). *Abatia* is a genus of nine montane species from Mexico and Central and South America of small- to medium-sized shrubs (to 4 m tall) commonly with numerous stamens (ca. 20 to 35) and an outer ring of filamentous staminodes. Baillon (1872) noted that two new species of *Abatia*, since described as *A. stellata* Lillo (1919) and *A. mexicana* Standley (1931), have as few stamens (4 to 8) as *Aphaerema*. Baillon (1872) considered the genera closely related and did not believe that the absence of staminodes was alone sufficient for generic status. Thus, he treated *Aphaerema* as part of *Abatia*. Furthermore, several other species of *Abatia*, *A. americana* (Gardner) Eichler, *A. glabra* Sleumer, and *A. microphylla* Taubert, have intermediate numbers of stamens (12 to 20) and form an overall morphological continuum between the larger, common species of *Abatia* with numerous stamens and staminodes and the diminutive *Aphaerema* with few stamens and no staminodes. Despite the clear continuity between *Aphaerema* and *Abatia*, their segregation has been maintained, with some authors producing dichotomous keys with number of stamens as a principal character, presumably unaware of the less common species or their characters (e.g., Hutchinson, 1967). Further evidence of their close relationship has been inferred from analyses of plastid DNA (Alford, 2005).

Although considering the two genera congeneric, Baillon (1872, 1875, 1876) never made the proper transfer of *Aphaerema* to *Abatia*, because he did not associate the epithet of *Aphaerema spicata* Miers with *Abatia* (ICBN Art. 33.1, Greuter et al., 2000). *Aphaerema spicata* is thus transferred formally to *Abatia* here, but because that epithet is blocked in *Abatia* by *Abatia spicata* (Turczaninow) Sleumer, a substitute name is introduced (cf. ICBN Art. 11.2–11.4, Greuter et al., 2000).

Abatia angeliana M. H. Alford, nom. nov. Replaced name: *Aphaerema spicata* Miers, Proc. Roy. Hort.

Soc. London 3: 295. 1863. TYPE: Brazil. Paraná: São Jerônimo da Serra, 1861, *J. Weir* 427 (lectotype, designated here, K 000187414; duplicates, BM, K).

A lectotype is chosen because Miers did not designate a holotype. He referred to a single collection in the protologue, *J. Weir* 427, of which one specimen exists at BM and two at K. Thus, the three specimens are syntypes. All specimens are of excellent quality, and the particular specimen at K is chosen due to the amount of material available on the sheet.

Etymology. The epithet honors João Alberto Angely (1917–), Brazilian botanist and editor of the small and short-lived series *Flacourtiaceae: Série científica devotada ao estudo geral das plantas desta família*.

KEY TO THE GENERA OF SALICACEAE WITH OPPOSITE OR WHORLED LEAVES

- 1a. Receptacular disk glands present; stamens often in fascicles opposite petals; ovary half-inferior *Homalium*
- 1b. Receptacular disk glands absent; stamens never in fascicles opposite petals; ovary superior.
 - 2a. Petals absent; inflorescence a many-flowered raceme; style not parted at apex; New World *Abatia*
 - 2b. Petals present; inflorescence a few-flowered cyme; style 2- or 3-parted at apex; South Africa *Pseudoscopia*

PRIAMOSIA

The monotypic genus *Priamosia* Urban from Hispaniola was described in 1919. Urban suggested that it is allied with *Xylosma* and perhaps *Azara* Ruiz & Pavón, genera that also have axillary inflorescences, receptacular disk glands (lacking in some *Azara*), and no petals, characteristics typical of the tribe Flacourtieae (cf. Warburg, 1893; Gilg, 1925; Lemke, 1988). Urban (1919) pointed out that *Azara* differs from *Priamosia* in having leaf-like stipules and that *Xylosma* differs from *Priamosia* in having more stamens. *Xylosma* has eight to numerous (ca. 50) stamens, while *Priamosia* has only four (Sleumer, 1980). *Priamosia* and *Xylosma* are also usually dioecious and have armed branches, while *Azara* is usually bisexual and never armed (Sleumer, 1980). Sleumer (1980) and Liogier (1981) further recorded that *Priamosia* has stipules while *Xylosma* does not, but this is inaccurate. Although leaf-like or scale-like stipules do not occur in *Xylosma*, except perhaps in the short shoots of *Xylosma bahamense* (Britton) Standley, stipules essentially reduced to single glands do occur in numerous species (Alford, pers. obs.). Because stipules of Salicaceae are sometimes glandular toothed, a gland in a stipule’s position is

probably the simple reduction of the laminar part of the stipule, leaving only the terminal tooth. A similar phenomenon has been observed in *Azara* (Charlton, 1994). The one reliable character differentiating *Xylosma* and *Priamosia* is stamen number.

Urban and Ekman in Urban (1930) later described *Xylosma microphyllum* Urban & Ekman based on a sterile specimen. This species turned out to be a synonym of *Priamosia domingensis* Urban, indicating that the morphological similarity between *Xylosma* and *Priamosia* could confuse even the botanist who described *Priamosia*. Later authors, including Barker and Dardeau (1930), Sleumer (1980), and Liogier (1981), have maintained the segregation of the genera, but Sleumer (1980: 127) recognized that *Priamosia* is “very close to *Xylosma*.” Female or sterile specimens of *Priamosia domingensis* are virtually indistinguishable from *Xylosma*, and analyses of plastid DNA data place it clearly within that genus (Alford, 2005). Because *Priamosia* was distinguished based on one unreliable character (stipule presence) and a single reliable character (stamen number, 4), which is highly variable, albeit not overlapping, in the closely related genus *Xylosma* (8 to numerous [ca. 50] stamens), there is no clear reason to maintain the two genera. Thus, I propose the transfer of *Priamosia* to *Xylosma*, and the needed combination is provided here.

Xylosma domingensis (Urban) M. H. Alford, comb. nov. *Priamosia domingensis* Urban, Repert. Spec. Nov. Regni Veg. 15: 412. 1919. TYPE: Hispaniola [Dominican Republic]. Civ. Santo Domingo: Cordillera Central, prov. de la Vega, Constanza, hillsides, pastures, thickets, ca. 1200 m, very common, 10 Nov. 1949, *E. L. Ekman* H14082 (neotype, designated here, NY; duplicates, A not seen, F not seen, G not seen, GH not seen, K not seen, LL not seen, S, US not seen).

Xylosma microphyllum Urban & Ekman, Ark. Bot. 23A(5): 88. 1930. TYPE: Haiti. Massif des Cahos prope Las Caobas ad Chapelle Ste.-Claire solo detritu calcario oblecto cr. 850 m alt., *E. L. Ekman* H5546 (holotype, S 04-192; isotype, S 05-961).

A neotype is designated because the holotype (*H. Eggers* 2285, B†) was destroyed in World War II. Photos of the holotype exist at F and NY, but no isotypes have been found. Very few quality specimens of *Xylosma domingensis* exist, but *Ekman* H14082 (NY) was chosen as neotype because the collection comes from the same area as the holotype (“Valle de Constanza”) and has numerous duplicates.

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